

# **Global Precipitation Mission (GPM) Ground Validation System Verification and Test Plan**

**PRELIMINARY DRAFT  
June 12, 2008**



Goddard Space Flight Center  
Greenbelt, Maryland 20771

## **CM FOREWORD**

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# **Global Precipitation Mission (GPM)**

## **Ground Validation System Verification and Test Plan**

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**June 12, 2008**

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### 3. Acronyms and Symbols

ACRONYM	DEFINITION

#### 4. Requirements

L3 Req't	DOORS L3 Req't	Description	Verification Method	Verification Procedure
GVS-2.1.05	GV52	Secure data rights	Inspection of Materials	Inspect hard-copy or electronic copy of data sharing agreements with participating data providers. Compare to data holdings from provider.
GVS-2.1.10	GV56	Manage data policies and procedures	Inspection of Materials	Verify access to, and inspect, GVS data management policy statements and documentation.
GVS-2.1.20	GV60	Conduct configuration management	Demonstration	Witness the operation of the configuration management application. Review the contents of the CM repository.
GVS-2.2.25	GV67	A&D contents	Inspection and Demonstration	Witness the operation of the archive and distribution mechanism. Review the contents of the GVS data archive.
GVS-2.2.30	GV74	A&D ingest capability	Inspection	Inspect the contents of the GVS archive before and after data ingest. Review logs for data archive programs.
GVS-2.2.35	GV78	A&D archive capability	Inspection	Inspect the contents of the GVS archive and verify that externally-generated data are available in their native format.
GVS-2.2.40	GV82	A&D search and order capability	Demonstration	Witness the operation of the archive and distribution mechanism's search and order capability.
GVS-2.2.45	GV86	A&D distribution capability	Demonstration	Witness the operation of the archive and distribution mechanism's data distribution capability.
GVS-2.2.50	GV90	A&D user services capability for PMM Science Team Members	Demonstration	As a PMM Science Team member, submit an inquiry to the GVS and obtain a copy of the GVS response.
GVS-2.2.55	GV94	A&D metrics capability	Inspection and Demonstration	Witness the operation of the archive and distribution mechanism's metrics generation and reporting capability.
GVS-2.2.60	GV98	A&D data delivery time-line	Demonstration	Witness the operation of the archive and distribution mechanism's data distribution capability. Verify that products ingested 24 or more hours ago are available.
GVS-2.2.65	GV102	A&D electronic data delivery	Demonstration	Witness the operation of the archive and distribution mechanism's electronic, on-line data distribution capability.
GVS-2.2.70	GV102	A&D long-term archive	Inspection	Test procedure is TBD. It will be dependent on the state of the technology at the end of the GVS life cycle. The total GVS holdings may be inspected at any time prior to this to assure their availability.
GVS-3.1.05	GV114	Instrument Documentation	Inspection of Materials	Inspect hard-copy or electronic copy of Instrument Handbooks from participating data providers present in the GVS archive.

<b>L3 Req't</b>	<b>DOORS L3 Req't</b>	<b>Description</b>	<b>Verification Method</b>	<b>Verification Procedure</b>
GVS-3.1.15	GV114	Product generation time-line	Demonstration	Witness the operation of the GVS product generation capability. Verify that all products dependent on data ingested 24 or more hours ago are available in the GVS database.
GVS-3.1.20	GV114	Product distribution time-line	Demonstration	Witness the operation of the GVS product distribution mechanism's data distribution capability. Verify that products created 24 or more hours ago are available.
GVS-3.1.25	GV133	File date/time stamps	Inspection	Access listing of sample data files from GVS product database. Examine file names to verify that time stamps are present.
GVS-3.1.30	GV138	Measurement time stamps	Inspection	Retrieve sample data files from GVS product database. Examine file names and/or contents to verify that data-specific time stamps are present.
GVS-3.1.35	GV143	Network Time Protocol (NTP) Server	Demonstration	Log into GVS and external data servers and data acquisition hosts, and the master NTP host. Verify the presence and operation of NTP time synchronization processes on each host.
GVS-3.2.05	GV149	X-band scanning radar product Cartesian grid	Inspection and Analysis	Acquire an X-band gridded radar product, and read or dump the product contents to obtain the grid definition parameters. Verify that the parameter values match the required values, taking into account the radar characteristics.
GVS-3.2.10	GV157	S-band scanning radar product Cartesian grid	Inspection and Analysis	Acquire an S-band gridded radar product, and read or dump the product contents to obtain the grid definition parameters. Verify that the parameter values match the required values, taking into account the radar characteristics.
GVS-3.2.15	GV165	X-band re-sampled equivalent reflectivity factor product	Inspection	Acquire an X-band gridded radar product, and read or dump the product contents to verify that the required field(s) are present.
GVS-3.2.20	GV170	X-band re-sampled differential reflectivity product	Inspection	Acquire an X-band gridded radar product, and read or dump the product contents to verify that the required field(s) are present.
GVS-3.2.25	GV175	X-band scanning radar specific differential phase product	Inspection	Acquire an X-band gridded radar product, and read or dump the product contents to verify that the required field(s) are present.
GVS-3.2.30	GV180	S-band re-sampled equivalent reflectivity factor product	Inspection	Acquire an S-band gridded radar product, and read or dump the product contents to verify that the required field(s) are present.

<b>L3 Req't</b>	<b>DOORS L3 Req't</b>	<b>Description</b>	<b>Verification Method</b>	<b>Verification Procedure</b>
GVS-3.2.35	GV185	S-band re-sampled differential reflectivity product	Inspection	Acquire an S-band gridded radar product, and read or dump the product contents to verify that the required field(s) are present.
GVS-3.2.40	GV190	S-band scanning radar specific differential phase product	Inspection	Acquire an S-band gridded radar product, and read or dump the product contents to verify that the required field(s) are present.
GVS-3.2.45	GV195	Scanning radar liquid water content product	Inspection and Analysis	Acquire an X-band gridded radar product, and read or dump the product contents to verify that the required field(s) are present. Repeat for the S-band gridded radar product.
GVS-3.2.50	GV199	Scanning radar hydrometeor identification product	Inspection and Analysis	Acquire an X-band gridded radar product, and read or dump the product contents to verify that the required field(s) are present. Repeat for the S-band gridded radar product.
GVS-3.2.55	GV205	Scanning radar median drop diameter product	Inspection and Analysis	Acquire an X-band gridded radar product, and read or dump the product contents to verify that the required field(s) are present. Repeat for the S-band gridded radar product.
GVS-3.2.60	GV210	Scanning radar instantaneous rain rate product	Inspection and Analysis	Acquire an X-band gridded radar product, and read or dump the product contents to verify that the required field(s) are present. Repeat for the S-band gridded radar product.
GVS-3.2.65	GV215	Scanning radar number concentration – liquid product	Inspection and Analysis	Acquire an X-band gridded radar product, and read or dump the product contents to verify that the required field(s) are present. Repeat for the S-band gridded radar product.
GVS-3.2.70	GV219	S and UHF band profiler pair median particle diameter product	Inspection	Acquire an S-band profiler median particle diameter product, and read or dump the product contents to verify that the required field(s) are present and have the required characteristics. Repeat for the UHF-band product.
GVS-3.2.75	GV226	S and UHF band profiler pair particle concentration product	Inspection and Analysis	Acquire an S-band profiler particle concentration product, and read or dump the product contents to verify that the required field(s) are present and have the required characteristics. Repeat for the UHF-band product.
GVS-3.2.80	GV233	S and UHF band profiler pair shape parameter product	Inspection and Analysis	Acquire an S-band profiler Gamma shape parameter product, and read or dump the product contents to verify that the required field(s) are present and have the required characteristics. Repeat for the UHF-band product.

<b>L3 Req't</b>	<b>DOORS L3 Req't</b>	<b>Description</b>	<b>Verification Method</b>	<b>Verification Procedure</b>
GVS- 3.2.82	GV240	S and UHF band profiler pair vertical air motion product	Inspection and Analysis	Acquire an S-band profiler vertical air motion product, and read or dump the product contents to verify that the required field(s) are present and have the required characteristics. Repeat for the UHF-band product.
GVS- 3.2.85	GV246	Disdrometer particle diameter product	Inspection	Acquire a disdrometer median particle diameter product, and read or dump the product contents to verify that the required field(s) are present and have the required characteristics.
GVS- 3.2.90	GV250	Disdrometer number concentration product	Inspection	Acquire a disdrometer particle concentration product, and read or dump the product contents to verify that the required field(s) are present and have the required characteristics.
GVS- 3.2.95	GV254	Disdrometer rain rate product	Inspection	Acquire a disdrometer rain rate product, and read or dump the product contents to verify that the required field(s) are present and have the required characteristics.
GVS- 3.2.100	GV258	Disdrometer radar reflectivity product	Inspection	Acquire a disdrometer estimated radar reflectivity product, and read or dump the product contents to verify that the required field(s) are present and have the required characteristics.
GVS- 3.2.105	GV262	Rain gauge rain rate product	Inspection	Acquire a rain gage rain rate product, and read or dump the product contents to verify that the required field(s) are present and have the required characteristics.
GVS- 3.2.110	GV266	Profiling microwave radiometer temperature profiles product	Inspection	Acquire a profiling microwave radiometer temperature profile product, and read or dump the product contents to verify that the required field(s) are present and have the required characteristics.
GVS- 3.2.115	GV273	Profiling microwave radiometer water vapor concentration profiles product	Inspection	Acquire a profiling microwave radiometer water vapor concentration profile product, and read or dump the product contents to verify that the required field(s) are present and have the required characteristics.
GVS- 3.2.120	GV280	X-band scanning radar equivalent reflectivity factor product	Inspection	Acquire an X-band radar equivalent reflectivity product in native coordinates, and read or dump the product contents to verify that the required field(s) are present.
GVS- 3.2.125	GV285	X-band scanning radar differential reflectivity product	Inspection	Acquire an X-band radar differential reflectivity product in native coordinates, and read or dump the product contents to verify that the required field(s) are present.

<b>L3 Req't</b>	<b>DOORS L3 Req't</b>	<b>Description</b>	<b>Verification Method</b>	<b>Verification Procedure</b>
GVS- 3.2.130	GV290	X-band scanning radar differential propagation phase product	Inspection	Acquire an X-band radar differential propagation phase product in native coordinates, and read or dump the product contents to verify that the required field(s) are present.
GVS- 3.2.135	GV295	X-band scanning radar co-polar correlation coefficient product	Inspection	Acquire an X-band radar co-polar correlation coefficient product in native coordinates, and read or dump the product contents to verify that the required field(s) are present.
GVS- 3.2.140	GV300	X-band scanning radar linear depolarization ratio product (optional)	Inspection	Acquire an X-band radar linear depolarization product in native coordinates, and read or dump the product contents to verify that the required field(s) are present.
GVS- 3.2.145	GV306	X-band scanning radar Doppler radial velocity product	Inspection	Acquire an X-band radar radial velocity product in native coordinates, and read or dump the product contents to verify that the required field(s) are present.
GVS- 3.2.150	GV311	S-band scanning radar equivalent reflectivity factor product	Inspection	Acquire an S-band radar equivalent reflectivity product in native coordinates, and read or dump the product contents to verify that the required field(s) are present.
GVS- 3.2.155	GV316	S-band scanning radar differential reflectivity product	Inspection	Acquire an S-band radar differential reflectivity product in native coordinates, and read or dump the product contents to verify that the required field(s) are present.
GVS- 3.2.160	GV321	S-band scanning radar differential propagation phase product	Inspection	Acquire an S-band radar differential propagation phase product in native coordinates, and read or dump the product contents to verify that the required field(s) are present.
GVS- 3.2.165	GV326	S-band scanning radar horizontal-vertical correlation coefficient product	Inspection	Acquire an S-band radar co-polar correlation coefficient product in native coordinates, and read or dump the product contents to verify that the required field(s) are present.
GVS- 3.2.170	GV331	S-band scanning radar linear depolarization ratio product (optional)	Inspection	Acquire an S-band radar linear depolarization product in native coordinates, and read or dump the product contents to verify that the required field(s) are present.
GVS- 3.2.175	GV337	S-band scanning radar Doppler radial velocity product	Inspection	Acquire an S-band radar radial velocity product in native coordinates, and read or dump the product contents to verify that the required field(s) are present.
GVS- 3.2.180	GV342	S-band profiler Doppler spectra product	Inspection	Acquire an S-band profiler Doppler velocity spectra product, and read or dump the product contents to verify that the required field(s) are present.

<b>L3 Req't</b>	<b>DOORS L3 Req't</b>	<b>Description</b>	<b>Verification Method</b>	<b>Verification Procedure</b>
GVS- 3.2.182	GV346	S-band profiler spectral moments product	Inspection	Acquire an S-band profiler spectral moments product, and read or dump the product contents to verify that the required field(s) are present.
GVS- 3.2.185	GV350	UHF profiler Doppler spectra product	Inspection	Acquire a UHF-band profiler Doppler velocity spectra product, and read or dump the product contents to verify that the required field(s) are present.
GVS- 3.2.186	GV354	UHF profiler precipitation spectral moments product	Inspection	Acquire a UHF-band profiler spectral moments product, and read or dump the product contents to verify that the required field(s) are present.
GVS- 3.2.187	GV358	UHF profiler vertical air motion product	Inspection and Analysis	Acquire a UHF-band profiler vertical air motion product, and read or dump the product contents to verify that the required field(s) are present.
GVS- 3.3.05	GV363	X-band scanning radar center frequency	Documentation	Obtain relevant documents, licenses, or other artifacts which validate the radar operating frequency or wavelength.
GVS- 3.3.10	GV367	X-band scanning radar minimum and maximum elevation	Demonstration	Witness the elevation scanning control capability over the stated elevation range in operation of the X-band scanning radar.
GVS- 3.3.15	GV371	X-band scanning radar minimum and maximum range	Demonstration	Witness the scanning range control capability over the stated ranges in operation of the X-band scanning radar.
GVS- 3.3.20	GV375	X-band scanning radar elevation pointing accuracy	Testing	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).
GVS- 3.3.25	GV379	X-band scanning radar elevation pointing uncertainty	Testing	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).
GVS- 3.3.30	GV383	X-band scanning radar azimuth pointing accuracy	Testing	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).
GVS- 3.3.35	GV387	X-band scanning radar azimuth pointing uncertainty	Testing	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).
GVS- 3.3.40	GV391	X-band scanning radar range resolution	Demonstration	Witness the scanning range resolution control capability and operation of the X-band scanning radar at the stated range resolution.

<b>L3 Req't</b>	<b>DOORS L3 Req't</b>	<b>Description</b>	<b>Verification Method</b>	<b>Verification Procedure</b>
GVS-3.3.45	GV395	X-band scanning radar horizontal/vertical resolution	Testing	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).
GVS-3.3.50	GV399	X-band scanning radar calibration stability	Testing and analysis	Execute standard radar calibration field tests on a repeating basis. Verify that the results remain within the stated requirement(s).
GVS-3.3.55	GV403	X-band scanning radar scan rates	Demonstration	Witness the scanning rate control capability and operation of the X-band scanning radar at the stated rate.
GVS-3.3.60	GV407	X-band scanning radar full volume scan time	Demonstration	Witness the volume scanning control capability and operation of the X-band scanning radar at the stated constraints. Examine the resulting product data.
GVS-3.3.65	GV412	Communications (Quick-look images within 15 minutes on network)	Demonstration	Access the host machine holding the X-band scanning radar quick-look images, obtain and/or display the most recent image for each required field, and list the available images. Verify that the available image times meet the requirements.
GVS-3.4.05	GV418	S-band scanning radar center frequency	Documentation	Obtain relevant documents, licenses, or other artifacts which validate the radar operating frequency or wavelength.
GVS-3.4.10	GV422	S-band scanning radar minimum and maximum range	Demonstration	Witness the scanning range control capability over the stated ranges in operation of the S-band scanning radar.
GVS-3.4.15	GV426	S-band scanning radar minimum and maximum elevation	Demonstration	Witness the elevation scanning control capability over the stated elevation range in operation of the S-band scanning radar.
GVS-3.4.20	GV430	S-band scanning radar range resolution	Demonstration	Witness the scanning range control capability over the stated ranges in operation of the S-band scanning radar.
GVS-3.4.25	GV434	S-band scanning radar horizontal/vertical resolution	Testing	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).
GVS-3.4.30	GV438	S-band scanning radar azimuth pointing accuracy	Testing	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).
GVS-3.4.35	GV442	S-band scanning radar azimuth pointing uncertainty	Testing	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).

<b>L3 Req't</b>	<b>DOORS L3 Req't</b>	<b>Description</b>	<b>Verification Method</b>	<b>Verification Procedure</b>
GVS-3.4.40	GV446	S-band scanning radar elevation pointing accuracy	Testing	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).
GVS-3.4.45	GV450	S-band scanning radar elevation pointing uncertainty	Testing	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).
GVS-3.4.50	GV454	S-band scanning radar calibration stability	Testing and analysis	Execute standard radar calibration field tests on a repeating basis. Verify that the results remain within the stated requirement(s).
GVS-3.4.55	GV458	S-band scanning radar full volume scan time	Demonstration	Witness the volume scanning control capability and operation of the S-band scanning radar at the stated constraints. Examine the resulting product data.
GVS-3.4.60	GV463	S-band scanning radar scan rates	Demonstration	Witness the scanning rate control capability and operation of the S-band scanning radar at the stated rate.
GVS-3.4.65	GV467	Communications	Demonstration	Access the host machine holding the S-band scanning radar quick-look images, obtain and/or display the most recent image for each required field, and list the available images. Verify that the available image times meet the requirements.
GVS-3.5.05	GV473	S-band profiler center frequency	Documentation	Obtain relevant documents, licenses, or other artifacts which validate the radar operating frequency or wavelength.
GVS-3.5.10	GV477	S-band profiler bandwidth	Testing and Analysis	Execute radar profiler tests or simulations over the range of transmitted pulse lengths and verify that the bandwidth of the receiver and processor can accommodate the return signal.
GVS-3.5.15	GV481	S-band profiler minimum and maximum range	Demonstration	Execute radar profiler tests over the minimum and maximum ranges and verify that the system can support observations over these ranges. Test with a real or simulated target returning up to 50 dBZ and verify that the signal is not saturated up this level.
GVS-3.5.20	GV485	S-band profiler antenna (beamwidth)	Testing and demonstration	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).
GVS-3.5.22	GV489	S-band profiler antenna shroud	Testing and Inspection	Examine the S-band profiler antenna for the presence of a shroud. Execute standard radar antenna calibration field tests. Verify that the sidelobe returns are reduced when the shroud is in place.
GVS-3.5.25	GV494	S-band profiler vertical resolution	Testing	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).

<b>L3 Req't</b>	<b>DOORS L3 Req't</b>	<b>Description</b>	<b>Verification Method</b>	<b>Verification Procedure</b>
GVS-3.5.35	GV498	S-band profiler minimum reflectivity sensitivity (dBZ)	Testing	Execute radar calibration field tests or simulations sufficient to determine the reflectivity lower threshold. Verify that the results are within the stated requirement(s).
GVS-3.5.40	GV502	S-band profiler calibration stability	Testing and analysis	Execute standard radar calibration field tests on a repeating basis. Verify that the results remain within the stated requirement(s).
GVS-3.5.45	GV507	S-band profiler unambiguous range	Testing and analysis	Execute radar calibration field tests or simulations sufficient to determine the unambiguous range threshold. Verify that the results are within the stated requirement(s).
GVS-3.5.47	GV511	S-band profiler dwell time	Testing and analysis	Provide test or documentation evidence of the profiler dwell time. Execute radar profiler tests or simulations sufficient to determine the performance of the system within the stated dwell time requirement.
GVS-3.5.50	GV515	S-band profiler Nyquist Doppler velocity and spectral resolution	Testing and analysis	Execute radar calibration field tests or simulations sufficient to determine the Nyquist velocity and Doppler spectral resolution. Verify that the results are within the stated requirements.
GVS-3.5.55	GV519	S-band profiler access to spectra for real time analysis	Demonstration	Access the host machine holding the S-band radar profiler real-time observation products. Obtain and/or display the most recent profile for each required field, and list the available profiles. Verify that the available products meet the timeliness and availability requirements.
GVS-3.5.60	GV523	S-band profiler local archive	Inspection	Access the local archive host and compare the daily data volume against the available storage to verify that sufficient capacity exists to hold 30 days of data.
GVS-3.5.62	GV527	S-band profiler back-up archive	Inspection	Access the local archive backup and verify the presence of the full set of data.
GVS-3.5.65	GV531	S-band profiler quick-look image product	Demonstration	Access the host machine holding the S-band profiling radar quick-look images, obtain and/or display the most recent image for each required field, and list the available images. Verify that the available image times meet the requirements.
GVS-3.5.70	GV537	S-band profiler unattended operations	Demonstration	Simulate or force a power failure to the S-band profiler instrument and processing system, and verify that the systems automatically return to full operational state when power is restored.
GVS-3.6.05	GV543	UHF profiler center frequency	Documentation	Obtain relevant documents, licenses, or other artifacts which validate the radar operating frequency or wavelength.

<b>L3 Req't</b>	<b>DOORS L3 Req't</b>	<b>Description</b>	<b>Verification Method</b>	<b>Verification Procedure</b>
GVS- 3.6.15	GV549	UHF profiler minimum and maximum range	Testing and analysis	Execute radar profiler tests over the minimum and maximum ranges and verify that the system can support observations over these ranges. Test with a real or simulated target returning up to 50 dBZ and verify that the signal is not saturated at minimum range.
GVS- 3.6.20	GV553	UHF profiler horizontal resolution (beamwidth)	Testing and analysis	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).
GVS- 3.6.25	GV556	UHF profiler vertical resolution	Testing and analysis	Examine the S-band profiler antenna for the presence of a shroud. Execute standard radar antenna calibration field tests. Verify that the sidelobe returns are reduced when the shroud is in place.
GVS- 3.6.30	GV560	UHF profiler minimum reflectivity sensitivity (dBZ)—precipitation	Testing and analysis	Execute radar profiler tests over the minimum range and verify that the system can support required observations at this range. Test with a real or simulated target returning up to 50 dBZ and verify that the signal is not saturated up this level.
GVS- 3.6.32	GV564	UHF profiler minimum reflectivity sensitivity (dBZ)—no precipitation	Testing and analysis	Execute radar calibration field tests or simulations sufficient to determine the reflectivity lower threshold in clear air. Verify that the results are within the stated requirement(s).
GVS- 3.6.35	GV568	UHF profiler calibration stability	Testing and analysis	Execute standard radar calibration field tests on a repeating basis. Verify that the results remain within the stated requirement(s).
GVS- 3.6.40	GV572	UHF profiler unambiguous range	Testing and analysis	Execute radar calibration field tests or simulations sufficient to determine the unambiguous range threshold. Verify that the results are within the stated requirement(s).
GVS- 3.6.42	GV576	UHF profiler dwell time	Testing and analysis	Provide test or documentation evidence of the profiler dwell time. Execute radar profiler tests or simulations sufficient to determine the performance of the system within the stated dwell time requirement.
GVS- 3.6.45	GV580	UHF profiler Nyquist Doppler velocity and spectral resolution	Testing and analysis	Execute radar calibration field tests or simulations sufficient to determine the Nyquist velocity and Doppler spectral resolution. Verify that the results are within the stated requirements.
GVS- 3.6.50	GV584	UHF profiler access to spectra for near real time analysis	Demonstration	Access the host machine holding the UHF-band radar profiler real-time observation products. Obtain and/or display the most recent profile for each required field, and list the available profiles. Verify that the available products meet the timeliness and availability requirements.
GVS- 3.6.55	GV588	UHF profiler local archive	Inspection	Access the local archive host and compare the daily data volume against the available storage to verify that sufficient capacity exists to hold 30 days of data.

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GVS-3.6.57	GV592	UHF profiler back-up archive	Demonstration	Access the local archive backup and verify the presence of the full set of data.
GVS-3.6.60	GV596	UHF profiler quick-look image product	Demonstration	Access the host machine holding the UHF-band profiling radar quick-look images, obtain and/or display the most recent image for each required field, and list the available images. Verify that the available image times meet the requirements.
GVS-3.6.65	GV602	UHF profiler unattended operation	Demonstration	Simulate or force a power failure to the UHF-band profiler instrument and processing system, and verify that the systems automatically return to full operational state when power is restored.
GVS-3.7.05	GV607	Precipitation gauge network temporal resolution	Testing and analysis	Perform controlled tests of rain gauges and processing systems and review resultant data to verify that gauges provide meaningful rain amount observations at one-minute intervals.
GVS-3.7.35	GV612	Precipitation gauge data distribution	Demonstration	Access the local archive host and compare the daily data volume against the available storage to verify that sufficient capacity exists to hold TBD-27 days of data. Witness the rain gauge network's data distribution capability.
GVS-3.7.40	GV616	Disdrometer network	Demonstration	Acquire disdrometer data products, and read or dump the product contents to verify that the drop size spectra, and derived rain rate and radar reflectivity fields are present and have the required characteristics.
GVS-3.7.45	GV620	Disdrometer drop size measurements	Testing and analysis	Perform controlled tests of disdrometers and processing systems and review resultant data to verify that the systems provide the required observations at a minimum of one-minute intervals.
GVS-3.7.55	GV624	Disdrometer data distribution	Inspection	Access the local archive host and compare the daily data volume against the available storage to verify that sufficient capacity exists to hold TBD-27 days of data. Witness the disdrometer network's data distribution capability.
GVS-3.8.10	GV629	Radiometer rain mitigation capability	Testing and analysis	Perform controlled tests of radiometers and processing systems and review resultant data to verify that the systems provide the required observations under conditions of rain rates of up to 6 mm/h.
GVS-3.9.05	GV635	Rawinsonde measured variables	Demonstration	Acquire a GVS rawinsonde product, and read or dump the product contents to determine the contents. Verify that the required values are present and in the defined format.

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GVS- 3.9.10	GV642	Rawinsonde measurement accuracies	Testing and analysis	Perform controlled tests of rawinsondes and processing systems and review resultant data to verify that the systems provide the required observations and accuracies.
GVS- 3.9.15	GV652	Rawinsonde flight capability	Demonstration	Launch rawinsondes and verify via pressure measurement and/or tracking that the flight reaches, and provides data to, the 100 mb level.
GVS- 3.9.20	GV656	Rawinsonde position tracking	Demonstration	Demonstrate the GPS tracking capabilities of the hardware, and review the positional data results.
GVS- 3.9.25	GV660	Rawinsonde independent surface measurements	Demonstration	Demonstrate the ground measurement instrument operation and ground calibration of the rawinsondes.
GVS- 3.9.30	GV660	Rawinsonde data quality control	Testing and analysis	Perform controlled tests of rawinsondes and processing systems and review resultant data to verify that the systems provide the required quality of observations.
GVS- 3.9.35	GV668	Communications	Demonstration	Access the host machine holding the rawinsonde raw and quality-controlled observation products. Obtain and/or display the most recent profile for each required field, and list the available profiles. Verify that the available products meet the timeliness and availability requirements.
GVS- 3.11.05	GV675	X-band scanning radar location	Inspection	Verify the distance between the X- and S-band radars via location on maps or by direct measurement.
GVS- 3.11.10	GV679	X-band scanning radar deployment capability	Demonstration	From an operational state, disassemble, pack and move the X-band radar, and unpack, assemble, and bring it back to an operational state within the stated times in the requirement.
GVS- 3.11.15	GV683	S and UHF profiler co- location	Inspection and Demonstration	Verify the distance between the UHF and S-band radar profilers by direct measurement.
GVS- 3.11.17	GV687	Profiler and scanner co- location	Inspection	Verify the distance between the UHF profiler and S-band radar via location on maps or by direct measurement.
GVS- 3.11.20	GVTBD	Precipitation gauge network design (TBD_30)	Inspection	
GVS- 3.11.25	GVTBD	Disdrometer network design (TBD_30)	Inspection	

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GVS- 3.11.40	GV699	Rawinsonde launch configurations	Inspection and Analysis	Inspect rawinsonde documentation and hardware, manpower, and deployment capabilities to verify that six (6) rawinsondes can be launched and tracked simultaneously without interference. Review rawinsonde launch location configuration to verify that the sampling pattern meets the science needs for the current GVS operations.
GVS- 3.11.45	GV703	Rawinsonde launch frequencies	Demonstration	Show via documentation and and/or actual demonstration that eight (8) rawinsonde soundings per site can be obtained daily.
GVS- 4.2.01	GV711	Acquire WSR-88D data	Inspection	Review the data holdings and log files of the VN system to verify the acquisition of the required WSR-88D data.
GVS- 4.2.05	GV717	Acquire TRMM PR data	Inspection	Review the data holdings and log files of the VN system to verify the acquisition of the required TRMM PR data.
GVS- 4.2.10	GV722	Acquire GPM DPR data	Inspection	Review the data holdings and log files of the VN system to verify the acquisition of the required GPM DPR data.
GVS- 4.3.01	GV728	Extract WSR-88D metadata	Demonstration	Run the software to extract WSR-88D metadata and obtain and view the resulting output from the GVS database.
GVS- 4.3.05	GV733	Extract TRMM PR metadata	Demonstration	Run the software to extract PR metadata and obtain and view the resulting output from the GVS database.
GVS- 4.3.10	GV739	Extract GPM DPR metadata	Demonstration	Run the software to extract DPR metadata and obtain and view the resulting output from the GVS database.
GVS- 4.3.15	GV745	Apply automated quality control	Demonstration	Run the software to automatically quality control WSR-88D data, obtain and view the resulting output, and compare to the original data.
GVS- 4.3.20	GV750	Apply manual quality control	Demonstration	Run the software to manually quality control WSR-88D data, obtain and view the resulting output, and compare to the original data.
GVS- 4.3.25	GV758	Maintain QC versions	Inspection	Review the data holdings and log files of the VN system to verify the storage and availability of the required data versions.
GVS- 4.4.01	GV765	Calculate overlap	Demonstration	Run the software to compute PR and DPR overlap and view the resulting output. Repeat for a different GV radar grid cutoff range. Compare against the PR/DPR data swath displayed on a map background.
GVS- 4.4.05	GV770	Variable time offset and area overlap thresholds	Demonstration	Run the software to compute PR and DPR coincidences for given time offsets and area overlaps and view the resulting output. Compare against the PR/DPR data swath displayed on a map background.

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GVS-4.4.10	GV778	Determine fractional area of precipitation	Demonstration	Run the software to compute fractional area of precipitation in the satellite/GV radar overlap area for each required data source and view the resulting output.
GVS-4.4.15	GV783	Data transformation and interpolation	Demonstration	Run the software to analyze PR/DPR and GV data to grids and view the resulting output. Compare gridded PR/DPR data against the matching GV data on a display.
GVS-4.4.20	GV789	Reflectivity transformation	Demonstration	Run the software to analyze PR/DPR and GV data to grids and view the resulting output. Inspect the source code to verify that the Z to/from dBZ transformation is implemented.
GVS-4.4.25	GV794	Variable parameters for common space/ground grid	Demonstration	Run the software to analyze PR/DPR and GV data to grids and view the resulting output. Compare gridded PR/DPR data against the matching GV data on a display. Repeat for a different set of grid parameters.
GVS-4.4.30	GV800	Gridded Radar Data Storage	Inspection	Review the GVS VN database to verify the presence of the required grid data and identifying attributes.
GVS-4.4.35	GV810	Grid Metadata	Demonstration	Run the software to extract grid product metadata and obtain the resulting output from the GVS database to verify the presence of the required grid metadata.
GVS-4.4.40	GV822	Alignment	Demonstration	Run the software to align PR/DPR and GV data and view the resulting output. Compare aligned data against the matching unaligned data on a display.
GVS-4.4.50	GV827	Averaging	Demonstration	Run the respective software to average PR/DPR and GV data during and after analysis to the grids, and view the resulting output. Inspect the source code to verify that the vertical averaging algorithm is implemented.
GVS-4.4.55	GV832	Extract vertical profiles	Demonstration	Run the software to extract vertical profiles of gridded PR/DPR and GV data and view the resulting output. Compare displayed data against a dump of the gridded data themselves.
GVS-4.4.60	GV837	Exclude selected observations	Demonstration	Run the software to generate statistical comparisons of PR/DPR and GV data and view the resulting output. Modify the criteria to exclude grid cells with physical characteristics stated in the requirements and view the modified results.
GVS-4.4.65	GV846	Reflectivity Comparison Products	Demonstration	Run the software to generate the required statistical comparisons of PR/DPR and GV data and view the resulting displays and tabulations.

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GVS-4.4.70	GV854	Automated QC in Comparison Products	Demonstration	Run the software to automatically quality control matching PR/DPR and GV grid data against error characteristics stated in the requirements, and extract and view the results as stored in the GVS VN database. Run the software to generate statistical comparisons of PR/DPR and GV data applying the criteria to exclude grid cells with error characteristics stated in the requirements, and view the results.
GVS-4.4.75	GV860	Manual Override QC flags	Demonstration	Run the software to generate statistical comparisons of PR/DPR and GV data, manually overriding the QC flags used to exclude grid cells with error characteristics stated in the requirements, and view the results.
GVS-4.4.80	GV866	Reflectivity Comparison Product Storage	Demonstration	Run or review the logs of the software to generate the routine statistical comparisons of PR/DPR and GV data, and verify that the resulting displays and tabulations are present in the VN database.
GVS-4.5.01	GV872	Default parameters for coincident data	Inspection	Review the default control inputs for the software used to compute PR and DPR coincidences for given time offsets and area overlaps and view the resulting default output.
GVS-4.5.03	GV877	User-defined parameters for coincident data	Demonstration	Create and access non-default control inputs for the software used to compute PR and DPR coincidences for user-defined time offsets and area overlaps, run the software against the user set, and view the resulting custom output.
GVS-4.5.05	GV882	Default parameters for common space/ground grid	Inspection	Review the default control inputs for the software used to analyze PR, DPR, and GV data to grids and view the resulting default output.
GVS-4.5.07	GV887	Default and user parameters for common space/ground grid	Demonstration	Create and access non-default control inputs for the software used to analyze PR, DPR, and GV data to grids, run the software against the user set, and view the resulting custom output.
GVS-4.5.10	GV892	Manual Quality Control	Demonstration	Run the software to manually quality control WSR-88D data, alternately accept and override the previous automated QC results, and obtain and view the resulting output.
GVS-4.5.15	GV897	Routine Process Initiation	Demonstration	Demonstrate the execution of the code or review the log files and resultant data from the VN routine data ingest, preprocessing, and quality control, as triggered by the clock or by the presence of new data, whichever applies to the given process.

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GVS-4.5.20	GV902	Non-Routine Process Initiation	Demonstration	Demonstrate the execution of the code or review the log files and resultant data from the VN data post-processing and statistical comparison programs for a user-defined data subset, as initiated by an authorized user.
GVS-4.5.25	GV907	User Access to Standard Validation Network Data Products	Demonstration	Access the GVS VN public data interface as an anonymous user, and select, view, and download reflectivity comparison display products from the public catalog.
GVS-4.6.5	GV912	Availability of Default Validation Network Data Products	Demonstration	Access the GVS VN interface for authorized users. Determine the most recent instance for each postprocessed and derived product, and compare to the list of the available raw products. Verify that the list of products is complete and products meet the stated timeliness and availability requirements.
GVS-4.6.10	GV917	User Requests for Non-Routine Data and Data Processing	Demonstration	Submit a specialized data or data processing request for non-routine data, using the available request mechanism. Verify that the request is acknowledged within two (2) working days, and that the requested data is made available within three (3) working days if no coding effort is required to fulfill the request.
GVSMR-2.1.1.1	GVSMR-18	Ku-band scanning radar center frequency	Design and Measurement	Obtain relevant documents, licenses, or other artifacts which validate the radar operating frequency or wavelength.
GVSMR-2.1.1.2	GVSMR-24	Ka-band scanning radar center frequency	Design and Measurement	Obtain relevant documents, licenses, or other artifacts which validate the radar operating frequency or wavelength.
GVSMR-2.1.1.3	GVSMR-30	Scanning radar beam width	Antenna Pattern Measurement	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).
GVSMR-2.1.1.4	GVSMR-36	Matched V & H antenna patterns in Ka-band	Measurement and Analysis	Execute standard radar antenna calibration/orientation field tests at Ka band. Verify that the results for each polarization are within the stated requirement(s).
GVSMR-2.1.1.5	GVSMR-40	Matched V & H antenna patterns in Ku-band	Measurement and Analysis	Execute standard radar antenna calibration/orientation field tests at Ku band. Verify that the results for each polarization are within the stated requirement(s).
GVSMR-2.1.1.6	GVSMR-44	Maximum Ka-band sidelobe	Measurement	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).
GVSMR-2.1.1.7	GVSMR-50	Maximum Ku-band sidelobe	Measurement	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).

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GVSMR-2.1.1.8	GVSMR-56	Cross-polarization isolation	Measurement	Receiver and antenna performance determined separately. Integrated cross-pol isolation to be calculated and verified by at least six principle plane antenna pattern measurements
GVSMR-2.1.1.9	GVSMR-62	Ku-band minimum detectable signal	Analysis using Measured Values	Calculate based on receiver noise floor measurements and other parameters such as the antenna gain, transmitted power and time-bandwidth product (pulse compression gain). Measurement comparisons with a well characterized system could also be used.
GVSMR-2.1.1.10	GVSMR-70	Ka-band minimum detectable signal	Analysis using Measured Values	Calculate based on receiver noise floor measurements and other parameters such as the antenna gain, transmitted power and time-bandwidth product (pulse compression gain). Measurement comparisons with a well characterized system could also be used.
GVSMR-2.1.1.11	GVSMR-78	Measure and record transmit and receive gain	:	Obtained from transmit and calibration channel measurements.
GVSMR-2.1.1.12	GVSMR-83	Ka-band receiver dynamic range	Measurement	Provide receiver gain calibration curve.
GVSMR-2.1.1.13	GVSMR-88	Ku-band receiver dynamic range	Measurement	Provide receiver gain calibration curve.
GVSMR-2.1.1.14	GVSMR-93	Ka-band and Ku-band beam co-alignment	Measurement and Analysis	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).
GVSMR-2.1.1.15	GVSMR-97	Receiver channel isolation	Measurement	Perform power measurements while injecting a known signal into opposite port.
GVSMR-2.1.1.16	GVSMR-101	Simultaneous transmission and simultaneous reception mode	Demonstration	Provide design documentation and field test evidence of the radar's capability to perform simultaneous transmission and reception.
GVSMR-2.1.1.17	GVSMR-106	Alternate transmit simultaneous receive mode	Demonstration	Provide design documentation and field test evidence of the radar's capability to perform alternate transmission and reception.
GVSMR-2.1.2.1	GVSMR-112	Scanning radar minimum operational range	Analysis.	Provide field test measurements that show the radar's minimum operational range.
GVSMR-2.1.2.2	GVSMR-116	Scanning radar minimum range resolution	Demonstration	Witness the range resolution control capability at the stated minimum range in operation of the Ka/Ku-band scanning radar. Provide design documentation and/or field test evidence of the radar's capability to provide this range resolution.

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GVSMR-2.1.2.3	GVSMR-120	Selectable radar range resolution		Witness the range resolution control capability over the stated range in operation of the Ka/Ku-band scanning radar. Provide design documentation and/or field test evidence of the radar's capability to provide these range resolutions.
GVSMR-2.1.2.4	GVSMR-124	Ka-band and Ku-band range gate alignment	Measurement and Analysis	Use fixed targets at known ranges and verify their identical positions within the Ka- and Ku-band data.
GVSMR-2.1.2.5	GVSMR-128	Scanning radar elevation pointing resolution	Demonstration	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).
GVSMR-2.1.2.6	GVSMR-132	Scanning radar azimuth pointing resolution	Demonstration	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).
GVSMR-2.1.2.7	GVSMR-136	Scanning radar elevation pointing knowledge uncertainty	Design and Analysis	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).
GVSMR-2.1.2.8	GVSMR-140	Scanning radar azimuth pointing knowledge uncertainty	Design and Analysis	Execute standard radar antenna calibration/orientation field tests. Verify that the results are within the stated requirement(s).
GVSMR-2.1.2.9	GVSMR-144	Azimuth radar scan rates	Demonstration	Witness the volume scanning control capability and operation of the Ka/Ku-band scanning radar at the stated constraints. Examine the resulting product data.
GVSMR-2.1.2.10	GVSMR-148	Elevation radar scan rates	Demonstration	Witness the volume scanning control capability and operation of the Ka/Ku-band scanning radar at the stated constraints. Examine the resulting product data.
GVSMR-2.1.2.11	GVSMR-152	Scanning radar minimum and maximum elevation	Demonstration	Witness the elevation scanning control capability over the stated elevation range in operation of the Ka/Ku-band scanning radar.
GVSMR-2.1.2.12	GVSMR-156	Scanning radar azimuth range	Demonstration	Witness the azimuthal scanning control capability over the stated range in operation of the Ka/Ku-band scanning radar.
GVSMR-2.2.1	GVSMR-162	Scanning radar equivalent reflectivity factor product	Measurement.	Acquire a Ka/Ku-band radar equivalent reflectivity product in native coordinates, and read or dump the product contents to verify that the required field(s) are present. Perform field calibration tests to verify the accuracy of the reflectivity values for the Ka- and Ku-bands.
GVSMR-2.2.2	GVSMR-166	Scanning radar differential reflectivity product	Measurement.	Acquire Ka/Ku-band radar differential reflectivity products in native coordinates, and read or dump the product contents to verify that the required field(s) are present. Provide test results with antenna pointing vertically to obtain accuracy in the differential reflectivity measurements for

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				the Ka- and Ku-band. Provide gain balance test results for the Ka- and Ku-band receivers.
GVSMR-2.2.3	GVSMR-171	Scanning radar differential propagation phase product	Measurement.	Acquire Ka/Ku-band radar differential propagation phase products in native coordinates, and read or dump the product contents to verify that the required field(s) are present. Perform vertical pointing tests to verify the accuracy of the differential propagation phase values for the Ka- and Ku-bands. Provide phase balance test results for both Ka- and Ku-band receivers. Measurement comparisons with a well characterized system could also be used.
GVSMR-2.2.4	GVSMR-175	Scanning radar co-polar correlation coefficient product	Measurement.	Acquire Ka/Ku-band radar co-polar correlation coefficient products in native coordinates, and read or dump the product contents to verify that the required field(s) are present. Perform vertical pointing tests during light rain event to verify the accuracy of the co-polar correlation coefficient values for the Ka- and Ku-bands.
GVSMR-2.2.5	GVSMR-179	Scanning radar linear depolarization ratio product (optional)	Measurement.	Acquire Ka/Ku-band radar linear depolarization products in native coordinates, and read or dump the product contents to verify that the required field(s) are present. Perform vertical pointing tests during light rain event to verify the accuracy of the linear depolarization ratio values for the Ka- and Ku-bands.
GVSMR-2.2.6	GVSMR-184	Scanning radar Doppler radial velocity product	Validation Method:	Acquire Ka/Ku-band radar radial velocity products in native coordinates, and read or dump the product contents to verify that the required field(s) are present. Perform comparisons with a well characterized system to verify the accuracy of the Doppler radial velocity values for the Ka- and Ku-bands.
GVSMR-2.2.7	GVSMR-188	Time series data collection	Demonstration	Witness time series data storage. Provide documentation on time series data format/content. Verify data collected meets time series requirement.
GVSMR-2.2.8	GVSMR-196	Unambiguous velocity requirement	Analysis	Via measurement and simulation, verify the parameters on which the Nyquist velocity depends, and determine the resulting unambiguous velocities for Ka- and Ku-band via the algorithm.
GVSMR-2.3.1	GVSMR-201	Communications	Demonstration	Access the host machine holding the Ka/Ku-band scanning radar quick-look images, obtain and/or display the most recent image for each required field, and list the available images. Verify that the available image times meet the requirements.

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GVSMR-2.3.2	GVSMR-206	Mobility	Demonstration.	Pack the complete Ka/Ku band radar system into its transportable container(s), and show that it may be transported.
GVSMR-2.3.3	GVSMR-210	Set up	Demonstration.	Unpack the complete Ka/Ku band radar system from its transportable container(s), set it up for operations, and show that it is fully functional.
GVSMR-2.3.4	GVSMR-214	Tear down	Demonstration.	From its operational state, shut down and pack the complete Ka/Ku band radar system into its transportable container(s) within 72 hours, and show that it is ready to be transported.
GVSMR-2.3.5	GVSMR-218	Thermal regime	Analysis	Validate the presence and operation of heating and cooling for all temperature-sensitive components of the radar system sufficient to allow operations in the stated temperature range. Via materials analysis, validate the ability of exposed components of the system to survive and operate within the stated temperature range,
GVSMR-2.3.6	GVSMR-222	Wind load operations	Analysis	Via materials and engineering analyses, validate the ability of the radar system to operate and provide valid observations in sustained winds up to 25 m/s.
GVSMR-2.3.7	GVSMR-227	Wind load survivability	Analysis	Via materials and engineering analyses, validate the ability of the radar system to survive sustained winds up to 35 m/s in a deployed but idle or self-protected state, absent large airborne debris.
GVSMR-2.3.8	GVSMR-233	Precipitation regime	Analysis and demonstration.	Show by analysis of applicable radar characteristics (sensitivity, power, dynamic range, frequency, pulse length, etc.) that the radar is capable of measuring the required precipitation rates, assuming a realistic DSD (for rain) and snow particle distribution (for snow). Once the radar is operational, demonstrate these measurement capabilities in actual precipitation situations against independent snow and rain rate measurements.
GVSMR-2.3.9	GVSMR-238	Metrics capability	Demonstration.	Demonstrate the production and reporting of required system metrics. Force the system states which result in the reporting of related metrics where possible, and inspect the resulting metrics.
GVSMR-2.3.10	GVSMR-244	Unattended operations (TBD-2)	Demonstration.	Demonstrate the required remote control, product creation and distribution, autonomous operation, and anomaly notification capabilities of the radar within the required time constraints while operating in (or starting from, in the anomaly case) a nominal operational state.
GVSMR-2.3.11	GVSMR-252	Check validity of data recorded	Demonstration.	Demonstrate the ability of the system to automatically detect and report data processing and storage anomalies, and both nominal and out-of-range data value conditions, for measured and derived variables and

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				system metrics.
GVSMR-2.3.12	GVSMR-256	Check validity of data distributed	Demonstration.	Demonstrate the ability of the system to automatically detect and report data product integrity and provide valid unix-compatible checksums on all locally-created data files being distributed from the system.
GVSMR-2.3.13	GVSMR-260	Local archive capability	Demonstration.	Demonstrate the operation of the GVSMR local archive and verify that stored data match the original source data, the required time period of data are available, and that multiple versions of data products are handled.
GVSMR-2.3.14	GVSMR-267	Data format	Demonstration.	Demonstrate the production of for-distribution GVSMR data products in a standard science or radar data format appropriate to the product type.
GVSMR-2.3.15	GVSMR-272	Product metadata	Demonstration.	Demonstrate that GVSMR data products contain the required metadata parameters within the data product and/or their file names.
GVSMR-2.3.16	GVSMR-278	Interface to standard analysis and display tools	Demonstration.	Demonstrate the production of GVSMR data products in a Sigmet IRIS compatible format, and their usability within Sigmet IRIS.
GVSMR-2.3.17	GVSMR-282	Commercial electrical power	Demonstration.	Demonstrate the operation of the GVSMR with the required commercial/external power sources, as available for testing. Provide design and engineering documentation of compatibility with the remaining required power sources.
GVSMR-2.3.18	GVSMR-289	Electrical generator	Demonstration.	Demonstrate the capability of the GVSMR operations, data acquisition and storage, and product generation and dissemination under its own source of power. Show by analysis or demonstration that the system can operate continuously under its own power source, for up to six weeks, under the range of environmental conditions specified in GVSMR-218.
GVSMR-2.3.19	GVSMR-294	Generation of measured products	Demonstration.	Demonstrate the system's ability to generate all products listed in Section 2.2 within 24 hours of taking the observation, while continuing to take radar observations, without generating a backlog of data processing.
GVSMR-2.4.1	GVSMR-300	Documentation	Demonstration.	Demonstrate the on-line delivery of required documentation in the form of electronic media.
GVSMR-2.4.2	GVSMR-306	Training	Demonstration.	Conduct training in the operation and maintenance of the GVSMR radar.
GVSMR-3.1.1	GVSMR-313	Scanning radar product Cartesian grid	Demonstration	Acquire an Ka- and Ku-band gridded radar products listed in Sections 3.1.2-3.1.9, and read or dump the product contents to obtain the grid definition parameters. Verify that the parameter values match the required values, taking into account the radar characteristics.

<b>L3 Req't</b>	<b>DOORS L3 Req't</b>	<b>Description</b>	<b>Verification Method</b>	<b>Verification Procedure</b>
GVSMR-3.1.2	GVSMR-321	Re-sampled equivalent reflectivity factor product	Demonstration for GVSMR-321a, analysis for GVSMR-321b.	For 321a: Acquire a Ka and Ku-band gridded horizontal and vertical polarization equivalent reflectivity factor products, and read or dump the product contents to verify that the required field(s) are present on the grid defined in GVSMR-313. For 321b: Compare gridpoint values to the original PPI values in the gridpoint area to validate the required accuracy of the grid resampling.
GVSMR-3.1.3	GVSMR-328	Re-sampled differential reflectivity product	Demonstration for GVSMR-328a, analysis for GVSMR-328b.	As in GVSMR-321a and b, but for differential reflectivity.
GVSMR-3.1.4	GVSMR-335	Specific differential phase product	Demonstration for GVSMR-335b, analysis for GVSMR-335a.	For 335a: Acquire Ka- and Ku-band radar specific differential propagation phase products in native range, azimuth coordinates, and read or dump the product contents to verify that the required field(s) are present. Validation of the Kdp accuracy is dependent on the accuracy of the _dp measurement, GVSMR-171. For 335b: Acquire Ka and Ku-band gridded specific differential phase products, and read or dump the product contents to verify that the required field(s) are present on the grid defined in GVSMR-313.
GVSMR-3.1.5	GVSMR-341	Liquid water content profiles	Demonstration.	As in GVSMR-321a, but for 3-D liquid water content.
GVSMR-3.1.6	GVSMR-345	Scanning radar hydrometeor identification product	Demonstration.	For 345a: Acquire a gridded hydrometeor identification product, and read or dump the product contents to verify that the required field(s) are present on the grid defined in GVSMR-313. For 345b: Demonstrate the hydrometeor classification into the required types with appropriate real or simulated GVSMR test data, and/or provide documentation of the classification algorithm.
GVSMR-3.1.7	GVSMR-351	Scanning radar median drop diameter product	Demonstration for GVSMR-351a, analysis for GVSMR-351b.	For 351a: Acquire a gridded median drop diameter product, and read or dump the product contents to verify that the required field(s) are present on the grid defined in GVSMR-313. For 351b: Calculate the D0 with appropriate real or simulated GVSMR test data, and/or provide documentation of the estimating algorithm.

<b>L3 Req't</b>	<b>DOORS L3 Req't</b>	<b>Description</b>	<b>Verification Method</b>	<b>Verification Procedure</b>
GVSMR-3.1.8	GVSMR-357	Scanning radar instantaneous rain rate product	Demonstration for GVSMR-357a, analysis for GVSMR-357b.	As in GVSMR-351a and b, but for instantaneous rain rate.
GVSMR-3.1.9	GVSMR-363	Scanning radar number concentration - liquid product	Demonstration for GVSMR-363a, analysis for GVSMR-363b.	As in GVSMR-351a and b, but for drop number concentration of liquid water.
GVSMR-3.2.1	GVSMR-368	Participate in pre-operational training	Demonstration.	Provide documentation evidence of participation in pre-operations training and ability to perform GVSMR operator functions.
GVSMR-3.2.2	GVSMR-372	Conduct configuration management	Demonstration.	Witness the operation of the GVSMR configuration management application. Review the contents of the GVSMR CM repository.
GVSMR-3.2.3	GVSMR-379	Interface to GVS Archive and Distribution Element	Demonstration	Develop comprehensive test procedures and conduct interface tests between the GVSMR system and the GVS Archive and Distribution Element. Verify that all required data and documentation from the GVSMR are successfully transferred to the GVS Archive and Distribution Element.